Error budget

Traceability
We want high accuracy

- Careful what we wish for
- Quantitative error budgets allow others to assess how well we are doing
- Difficulty is that others may not be following proper error budget determinations and their results may appear better.
Traceability

Traceable error budget means that the same physical measurement from different sensors will be directly comparable.

If traceable, all differences between the two sensors larger than the combined uncertainties would be physically-based.

Traceability does not mean low absolute uncertainty.
Traceable to reflectance

The UofA reflectance-based results are traceable to NIST via pressed PTFE reflectance standard

- Radiance-based measurements are traceable to standards of spectral irradiance
- UofA also has a primary standard of reflectance from NIST
- Solar irradiance models that are used have traceability to standards of spectral irradiance
- Error budgets can be developed based on the NIST traceability
  - Also evaluated using sensitivity studies
  - Finally evaluated compared to measured data
- Some debate as to whether reflectance can be SI traceable
Solar radiation

Solar irradiance is one pathway to traceability

- Solar irradiance is measured with reference to the electric Watt
- Knowing the traceability to the solar irradiance and our error budgets on all other uncertainties would lead to a traceable at-sensor radiance

![Graph showing spectral irradiance vs wavelength](image)

![Graph showing percent difference vs wavelength](image)
ASTER relies on WRC solar model in the vicarious calibration and atmospheric correction.